10/500678

DT15 Rec'd PCT/PTO 0 2 JUL 2004

COLLAPSIBLE CONTAINER COMPRISING A CONTAINER BASE AND FOUR COLLAPSIBLE LATERAL WALLS

The invention relates to a collapsible container according to the preamble of claim 1.

Collapsible containers of this kind are widely used in trade because the containers can be reduced in size simply by folding the walls inwards towards the base, and can provide ample transport and receiving volume when the lateral walls are folded outwards into upright position. Containers of this kind have a container base that is usually rectangular, to the edges of which the collapsible lateral walls are hinged, for example by articulated hinges or by integrally moulded-on film hinges. When in the folded out or upright position, the lateral walls are interconnected by a snap-in catch, with appropriate snap locks on one pair of opposite lateral walls engaging behind corresponding latches on the other pair of opposite lateral walls. However, releasing the catch on this kind of collapsible container in order to convert the collapsible container from its service condition with upright lateral walls into the collapsed position with folded-down lateral walls is often problematic. Depending on the design of the collapsible container, folding the lateral walls upwards towards the snap-in catch in order to form the collapsible container is often awkward, too, and for non-specialists who are unfamiliar with the catch mechanism frequently difficult to do. Moreover, some containers give the impression of being very unstable when assembled, because the snap-in catch is not sturdy. Often, the lateral walls of the assembled container are not held firmly by the snap-in catches and therefore remain wobbly. When handled, these assembled collapsible containers are rickety and often collapse by accident, which is of course extremely annoying.

The object of the invention is to provide a collapsible container with lateral walls that can be folded upwards into upright position, which container ensures that the upright-folded lateral walls are interconnected by very sturdy snap-in catches and which permits simple releasing and locking of the lateral walls in their collapsed and upright-folded positions, especially for large collapsible containers.

This object is established according to the invention by the features contained in the characterizing part of claim 1; useful developments of the invention are achieved by the features contained in the sub-claims.

According to the invention, the catch members are configured as pivoting locks. Each pivoting lock is expediently shaped as a circular-sector-shaped component and mounted on two opposite lateral walls. A pivoting lock of this kind immediately conveys to a non-specialist how to actuate the locking and release mechanism, namely by appropriate rotary movement of the pivoting lock. It is also easy to convey this information visually to the user of the collapsible container, for example by means of an arrow painted on the pivoting lock or otherwise applied thereto.

The pivoting locks are preferably mounted on the short lateral walls in each case. When the lateral walls are to be collapsed, these short walls are folded towards the base first, and then the long lateral walls are folded down onto the collapsed short walls. The pivoting locks are expediently mounted at the two upper edges of the short lateral walls, in particular at the two upper corner areas of the lateral walls in question.

Rotation of the pivoting lock ensues via a pivot pin which expediently serves simultaneously as a connecting member for mounting the pivoting lock on the lateral wall.

To this end, the pivoting lock is expediently configured with a pivot pin provided with latches, with which pivot pin the pivoting lock can be engaged in a corresponding bushing in the lateral wall. In the engaged position, the pivoting lock can then be rotated about the axis of the pivot pin. Of course, it is also possible to configure the pivot pin on the lateral wall and the bushing on the pivoting lock.

The locking mechanism works via projecting locking tongues configured on the pivoting lock and engaging behind corresponding locating lugs on the lateral walls, preferably the long lateral walls, on the other side of the corner. The pivoting lock is expediently opened against a pretensioning spring, which, as the pivoting lock is opened, is pressed against a stop and thus pretensioned. When the pivoting lock is then let go again, the locking tongue extends again automatically and the pivoting lock moves into its rest position. Releasing the lateral walls thus only necessitates manually rotating the pivoting lock, which is easily done by gripping a grip member on the pivoting lock and swinging said grip member upwards; simultaneously with the rotary movement, the lateral walls can be collapsed inwards. According to another configuration or embodiment of the locking mechanism, the opening movement can also ensue by swinging the grip member sideways or downwards;

here too, the lateral walls can be collapsed inwards substantially simultaneously. When the pivoting lock is then released, the spring pretensioning force causes it to return to its starting position, in which the locking tongues are extended. If the collapsible container is to be converted from its collapsed condition to its service condition with upright walls, it is merely necessary to fold the two long lateral walls upwards, followed by the two short lateral walls. The locking tongues are pressed in automatically when they ascend the locating lugs, this expediently being favoured by suitable ramp surfaces, and the spring becomes pretensioned. As soon as the locking tongues have moved behind the locating lugs, locking ensues automatically; this is because the pivoting lock is rotated by the spring tensioning force that has built up, and the locking tongues are extended and engage behind the locating lugs. Suitable detent members are expediently attached to the lateral walls on the other side of the corner, resulting in a sturdy snap connection between the collapsible lateral walls, which accordingly do not wobble. The invention is characterized by very easy handling as far as releasing and locking the lateral walls in upright position is concerned, and it also guarantees very secure snap connections between the walls, which accordingly do not wobble. Actuation, that is, opening and closing, of the collapsible container also ensues automatically by appropriate actuation on the part of the user of the collapsible container, who grips the pivoting locks and rotates them to release the lateral walls, which can then be collapsed inwards onto the base. To assemble the container in its service form, it is only necessary to fold the lateral walls upwards. Locking of the lateral walls to form sturdy, snap-in connections ensues automatically, without the need for manual operation of the pivoting locks, ascent ramps or the like.

In the following, a preferred embodiment of the invention is described with reference to the drawings, which are purely schematic and intended as examples.

Fig. 1 shows a partial perspective view of the corner area of a collapsible container, and depicts the pivoting lock;

Fig: 2 shows a perspective view just of the pivoting lock, seen from behind;

Fig. 3 shows an analogous perspective view of the pivoting lock of Fig. 2, but from the front side, which is visible from the exterior;

Fig. 4 shows a perspective view of the collapsible lateral wall, in which the pivoting lock of Figs. 2 and 3 is accommodated;

Fig. 5 shows a partial view of the adjacent collapsible lateral wall, on the other side of the corner, which serves as a detent for the lateral wall shown in Fig. 4.

In the embodiment illustrated in the drawings, the pivoting lock is denoted generally by the reference numeral 1. The pivoting lock 1 is accommodated in a first collapsible lateral wall 2, which, in the embodiment illustrated, is the short lateral wall of a container made up of four collapsible lateral walls. Although not illustrated in the drawings, the collapsible lateral walls are hinged via suitable joints to the base of the container and can be folded inwards one above the other. To do this, first the opposing short lateral walls 2 are folded inwards onto the container base, then the two long lateral walls, which are likewise opposite each other and are adjacent to the short lateral walls, are folded inwards, on top of the folded-down narrow lateral walls 2, onto the base. The second lateral walls, also referred to here as long lateral walls, are denoted by the reference numeral 3.

To accommodate the pivoting lock 1, the first lateral wall 2 is provided with a corresponding complementary recess 4. This is especially apparent from Figure 4. When inserted into the recess 4, the pivoting lock 1 is advantageously mounted within the recess 4 such that it is substantially flush with the lateral wall 2 and does not project beyond the exterior surface thereof. For mounting, the pivoting lock 1 is configured with a pivot pin 5 that has a latch 6 at its free end. In the embodiment illustrated, two opposing, flare-shaped latches 6 are provided. Via this pivot pin 5, the pivoting lock 1 can be inserted and locked in a bushing 7 configured within the recess 4 in the first lateral wall 2. To this end, the pivot pin 5 is provided with a through radial slit 8, so that, when the pivot pin 5 is being inserted into the bushing 7, the pivot pin can be pressed together to some extent. As soon as the latches 6 have been pushed through the bushing 7, the pivot pin expands again on account of the elastic restoring forces. The pivoting lock is thus releasable, but at the same time firmly and sturdily locked with the first lateral wall in which it is nevertheless rotatably mounted.

As is apparent, the pivot pin/bushing connection described here forms the pivot for the pivoting lock 1. As is best seen in Figures 2 and 3, the pivoting lock 1 is configured as a circular-sector-shaped component, the centre of which is formed by the centrally disposed pivot pin 5. For purposes of actuation, the pivoting lock 1 is provided, behind a grip recess

9, with a grip member 10 within a grip ledge. The pivoting lock is additionally configured with a projecting locking tongue 11, which, in the locked position illustrated in Figure 1, engages behind a locating lug 12 on the adjacent lateral wall 3 on the other side of the corner (see Fig. 5). As best seen in Figure 3 and Figure 5, both the projecting locking tongue 11 and the inwardly-projecting locating lug 12 on the second lateral wall 3 have an inclined ascent ramp or ramp surface 13 and 14 respectively, which have matching gradients. Locking ensues on account of two contacting surfaces, namely the surface X on the lateral wall (Fig. 5) and the surface Y on the pivoting lock 1or its locking tongue (Fig. 2). In the locked position illustrated in Figure 1, the pivoting lock 1 is pretensioned by a pretensioning spring 15 which, in the embodiment described, is either moulded integrally with the pivoting lock or is otherwise mounted thereon. In this embodiment, the pretensioning spring is configured as an arcuate flexible tongue. This flexible tongue 15 interacts with a stop 16 on the first lateral wall 2. As shown in Fig. 4, this stop 16 is configured as a U-shaped moulding 16 which projects into the recess 4. Once again, the stop 16 is expediently moulded integrally with the lateral wall 2. When the pivoting lock 1 is in the installed position, the free end of the flexible tongue 15 abuts the stop 16. In the locked position, the two surfaces X and Y abut against each other, and the walls are held in the upright position. By opening the pivoting lock, the surface of the bar rotates away and the walls can be collapsed. On account of its previously described pretension, the bar springs into its rest position. During closing of the walls, the rotary movement is generated automatically by the inclined surfaces 12, 14 and 11, 10. By way of the rotary movement one defines, so to speak, the position of a "surface", as a result of which a form closure is created. To release the pivoting lock from the position illustrated in Fig. 1, the grip ledge 10 is rotated about the pivot pin 5 in the direction of arrow 17; as a result, the flexible tongue 15 is tensioned against the stop 16. With this opening movement in the direction of arrow 17, the locking tongue 11 is released from its locking position behind the locating lug 12, so that the first lateral wall 2 can be collapsed inwards onto the base of the container. If one lets go of the grip ledge 10 here, the pivoting lock 1 moves in the opposite direction to arrow 17, i.e. in the engaging position of the flexible tongue 11, because of the spring tension that has built up. This does not hinder the opening movement, however, because the lateral wall has already collapsed down towards the base, and the flexible tongue 11 has already passed over the locating lug 12.

If the container is to be assembled again, i.e. the lateral walls snapped into locking position, the two short lateral walls are folded upwards; shortly before the upright position, the ramp surfaces 13 of the locking tongues 11 reach the inclined ascent ramp 14 of the respective locating lug 12, causing the pivoting lock to rotate automatically in the direction of arrow 17. As a result, the locking tongues 11 pass behind the locating lugs 12 and then, on account of the spring tension, engage. This happens because while the locking tongues 11 are ascending the locating lugs 12 via the ramp surfaces 13 and 14, the respective lock is swivelled in the direction of arrow 17, thereby pretensioning the flexible tongue 15 so that, after passing over the locating lugs 12, the pivoting locks 1, which are preferably mounted at the two upper edges, i.e. at the two upper corner areas of the two first, i.e. oppositely disposed lateral walls 2, can be moved – thanks to the spring pretension – into the snap-in position behind the locating lugs. This configuration ensures a very secure snap connection for the assembled lateral walls, these being snapped very easily into locking position by folding the opposing short lateral walls 2 into the upright position. The pivoting locks need not be actuated to do this.

To limit the movement of the pivoting lock, an arcuate guide element 18 in the form of an oblong hole is configured within the recess 4, into which guide element a catch member 19 configured on the pivoting lock 1 or mounted thereon engages. The ends of the oblong guide element 18 thus limit the movement of the pivoting lock.

The pivoting lock is expediently coupled with a safety catch (not illustrated) that prevents the pivoting lock from opening and thus prevents the first lateral walls from accidentally collapsing when several containers are in stacked position. The safety catch is expediently configured as an upwardly projecting locking pin located on the upper edge of the pivoting lock, approximately at the position indicated by 20, and in particular being configured integrally with the pivoting lock. When the pivoting lock moves in the direction of arrow 17, thus releasing the locking mechanism, the locking pin moves upwards out of a corresponding opening at the upper edge of the first lateral wall 2. However, the movement of the locking pin is blocked by the base of the container stacked above the container in question, so that the pivoting lock 1 of a stacked container cannot be rotated in the direction of arrow 17 and thus opened.

In order to ensure that the assembled or upright lateral walls are securely locked in position, the second lateral walls 3 are expediently provided with detent members against which the upright first lateral walls abut. This arrangement prevents the latter from swinging further outwards. To this end, as is seen in Fig. 5, detent ridges 21 are configured immediately behind the locating lug 12. It is useful here if the detent ridge has an opening 28, for example a slot, so that the position of the lock is apparent from the exterior. This is easier if the locking tongue has different colours. Additional detent members 22 and 23 with groove-like recesses 24 and 25 are configured at the upper and lower edges of the lateral wall 3. When the container is assembled, corresponding flexible elements 26 and 27 on the first lateral wall 2 move into these groove-like recesses 24 and 25, thus ensuring sturdy and reliable snap-in connections between the upright lateral walls. This is of substantial importance for customer acceptance of collapsible containers of this kind.

The pivoting locks 1 are expediently of integral configuration, being made, in particular, of plastic, and engaging as a single component in the complementary recess in the first lateral wall. This facilitates both the production process and use. The advantage of the pivoting lock consists in that a catch mechanism is provided which is very easy to operate and which permits secure locking and releasing even of large containers, especially large containers measuring 60 x 80 cm and more. Just a single action and a single operation, namely gripping and rotating the pivoting lock using the grip moulding 10, are required to release and simultaneously collapse the lateral walls in the direction of the base. The lateral walls also engage automatically with each other when they are folded upwards to assemble the container, which is of substantial importance for customer acceptance of this catch mechanism and of the collapsible containers. This system simultaneously guarantees a very sturdy container configuration of upright, mutually engaged lateral walls.